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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/673,181	09/30/2003	William Ching-Chit Hung	50103-509	1577

49745 7590 05/26/2006  
SEAGATE TECHNOLOGY LLC  
c/o MCDERMOTT WILL & EMERY LLP  
600 13TH STREET, NW  
WASHINGTON, DC 20005-3096

EXAMINER

CHASE, SHELLY A

ART UNIT	PAPER NUMBER
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2133

DATE MAILED: 05/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/673,181	<b>Applicant(s)</b> HUNG, WILLIAM CHING-CHIT	
	<b>Examiner</b> Shelly A. Chase	<b>Art Unit</b> 2133	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 30 September 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 19 and 20 is/are allowed.
- 6) ☒ Claim(s) \_\_\_\_\_ is/are rejected.
- 7) ☒ Claim(s) 7-12 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

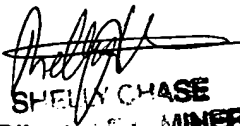
### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

  
SHELLY CHASE  
PRIMARY EXAMINER

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. Claims 1 to 20 are presented for examination.

#### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 13 to 18 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The claim is drawn to a single means and the statutes requires that the enabling disclosure of the specification be commensurate in scope with the claim under consideration.

#### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Song et al. (*Applications of Low-Density Parity Check Codes to Magnetic Recording Channels*, IEEE).

Claim 1:

**Song** teaches a magnetic recording system using low density parity check (LDPC) codes for error correction, the system comprising: a step of encoding the user data before recording it (see page 919, sect. III) and a step of using a LDPC decoder to perform LDPC decoding operations on the recorded user data (see pg. 919, sect. III).

***Claim Rejections - 35 USC § 103.***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2 to 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Song et al. in view of Mittelholzer (*Reduced-complexity decoding of LDPC codes for generalized partial response channels*, IEEE)

As per claim 2, Song teaches that the LDPC code uses a sparse parity check matrix H with n-rows by m-columns, (see pg. 918 intro.). Song does not specifically teach that any two columns of the LDPC have a maximum of one common location containing a non-zero entry; however, Mittelholzer in an analogous art teaches

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decoding for LDPC codes for partial response channels wherein the parity check matrix includes that no two rows have overlapping 1's in one position (see pg. 723 sect. A).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the decoding process of Song to include a step of no two rows have overlapping 1's in more than one position as taught by Mittelholzer since, Mittelholzer teaches that a reduced complexity algorithm is achieved without short cycles. This modification would have been obvious because a person of ordinary skill in the art would have been motivated to employ a reduced complexity decoding system for decoding LDPC codes as taught by Mittelholzer (see pg. 724 par. 2).

As per claim 3, Song teaches that the received data is encoded with a 16/17 rate QMTR code, and that the column weight  $W_c$  is 3 (see pg. 919 sect., III, to sect., IV). Song also teaches that construction of LDPC codes is dependent on a uniform row weight with the constraints based on the length  $N$  (see pg. 918 intro. and 922 sect. V).

As per claims 4 to 6, Song teaches that a full rank matrix can be constructed of  $m$ -rows by  $n$ -columns however; Song fails to specifically teach that the LDPC matrix has a size of 272-rows by 4624 column or 272-rows by 272-columns. Mittelholzer in an analogous art teaches various blocks lengths and rates of the LDPC codes as well as the parity check matrix is constructed from  $j$  sub-matrices with  $m$  rows by  $n$  columns wherein  $N$  symbol nodes corresponds to each bit in the codeword and  $M$  check nodes corresponds to the parity checks represented by the rows of the matrix (see pg. 723 sect. A). Therefore, it would have been obvious to one having ordinary skill in the art at

the time the invention was made to modify the parity check matrix of song to include the matrix of Mittelholzer, since Mittelholzer teaches that the construction of the matrix may vary based on the specific constraint. This modification would have been obvious because a person of ordinary skill in the art would have been motivated to employ any size for the parity check matrix in order to achieve better coding performance as taught by Mittelholzer.

***Allowable Subject Matter***

7. Claims 7 to 12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. Claims 19 to 20 are allowed.

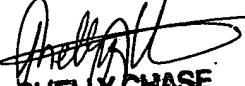
9. The following is a statement of reasons for the indication of allowable subject matter: the prior art made of record teaches encoding and decoding a LDPC code as detailed above; however, the prior art made of record taken alone or in combination fails to teach or fairly suggest or render obvious the novel element of the instant invention. Therefore, the primary reason for the allowance of the claim is the inclusion of the limitation of "a decoder that includes a tone detector that detects a frequency in at least one tone field" as recited in independent claim 19.

**Conclusion**

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shelly A. Chase whose telephone number is 571-272-3816. The examiner can normally be reached on Mon-Thur from 8:00 am to 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert Decady can be reached on 571-272-3819. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
**SHELLY CHASE**  
**PRIMARY EXAMINER**